

# Towards an Internationalization of the Information Systems Curriculum

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# **Towards an Internationalization of the Information Systems Curriculum**

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## **Abstract**

Globalization has changed the requirements to professionals and students in all branches and sectors significantly in the past decade. However in the domain of Information Systems, these changes have not yet found their way into current study programs and curricula. We identify and validate core internationalization competences and their relation to IS specific competences based on an initial set of competence categories. This is the basis for designing learning services of the future. The presented study aims at validating both and identifying additional categories and competences. In this paper, we present the first results of this study focusing on the internationalization and knowledge management competences. The results can be used for different purposes exploring the human perspective on information systems development.

## **1 Introduction**

The main goal of this paper is to identify both the main competence categories necessary for an internationalized IS curriculum for globally working professionals, in particular in knowledge-intensive settings. By identifying competences to deal with cultural characteristics of globally distributed teams and work environments, we set the basis for designing learning services based on an empirically derived set of competences.

In the IS world, the shift towards international and global work is visible everywhere. This means that graduates of IS are confronted with global work environments and challenging work in international projects, in particular regarding cultural characteristics. This shift was addressed already in the change and introduction of new curricula in other domains, e.g. in business education. New studies such as international business and the European business programs were introduced. However, the IS curriculum in Higher Education institutions was not adapted to these changes.

The importance for an internationalization of the IS curriculum was shown for example by Deans and Loch [3]. Their study indicated that the majority of participants saw the internationalization as very important but did not expect the curriculum to change in the nearer future. An analysis of existing model curricula of IS, mainly focusing on the ACM model curriculum [5] and the German Model Curriculum for business information systems [19], showed that just few aspects of internalization were introduced in the model curricula [13]. This supports the prediction made by Deans and Loch [3] that the adaptation of the curriculum will not be done in the nearer future.

In this paper, we present the results of a study aiming at verifying the identified competence categories and identifying an initial set of generic competences for these competence categories as well as the validation of the complete study. This leads to the following research questions for our study:

- Which categories of competences are important for an internationalized IS curriculum and as how important are they seen?
- Which are the most important generic competences for each category as a basis for learning service design?

## 2 Background

### 2.1 Competence

A variety of definitions of competences is currently discussed (cf. [6][11]). There are, depending on the research community, differences in the understanding of competences and related concepts like competency and learning outcome. As a basis, we use the related concept Learning Outcomes (LO), defined in the European Qualification Framework as “[...] statements of what a learner knows, understands and is able to do on completion of a learning process” [4]. When applied to a certain problem in a certain context, Learning Outcomes can be seen as competences. We define thus competences as *a collection of skills, abilities, and attitudes to solve a problem in a given context*.

To identify competences and competence categories relevant for an international IS curriculum, different model curricula, research papers and competence frameworks were analyzed. Table 1 shows an overview of perspectives and focus areas of analyzed sources.

Source Name	Source Type	Reference
ACM model curriculum	Model curriculum	[5][16]
Business Information Systems	German model curriculum	[19]
American Assembly of Collegiate Schools of Business International business curriculum	Model curriculum	[1]
The MBA Core Curricula of Top-Ranked U.S. Business Schools: A Study in Failure?	Research	[12]

**Table 1: Examples of analyzed sources for competences and competence categories**

The analysis of the literature review revealed that the sources included competences from different categories. From the analysis, we have derived an initial classification of competences which correspond to main challenges in global settings (see [2][14]) and domain-specific competences (cf. [5]). We can distinguish between inter- or cross-cultural, communication, collaboration, project and knowledge management and domain-specific competences. Examples for these competences are the ability to share knowledge and the ability to use other people's knowledge and expertise. The aspects of knowledge management were included in different categories such as collaboration and project management.

It became also clear that the competences were not always categorizable to just one of the before mentioned categories. Instead they could be seen as cross-category competences combining e.g. cross-cultural and communication competences or communication and management competences. The competences of each category additionally included ICT competences (Information- and Communication technology competences) such as using the right medium for communication. In the categories communication and collaboration, competences within the different sources were coherent and the same competences were included in most of them, just using a slightly different phrasing. As already mentioned, intercultural and ICT competences were strongly connected to competences of different categories and just few competences belong purely to these categories could be identified. The identified competences are additionally not on an atomic detail level, meaning addressing just one specific aspect. Instead they are combinations of atomic competences addressing several aspects such as the ability to adapt and adjust strategies, goals and plans according to the situation.

According to our definition of competences a set of different sources were analyzed. Hereby, we identified competences from different subject areas or categories included in the framework. The following chapter will give a deeper inside into these categories and their origin from the literature.

## **2.2 Internationalization Curriculum**

In this chapter, we present basic findings regarding necessary competences from international IS project work as well as from our literature review regarding challenges to individuals and organization in global IS projects.

As a basis for our work, we have analyzed literature on global (software development) projects regarding main barriers and success factors and existing model IS curricula such as the ACM model curriculum. We also analyzed the literature for intercultural competences necessary in international settings. Outgoing from these findings we will develop a curriculum and set of competences for international IS. As one of the main influence factors for the internationalization curriculum we analyzed literature on barriers and success factors for international work. We assume that success factors related to knowledge and skills can be directly translated into concrete competences. Carmel [2] identified five main barriers for distributed teams: geographical dispersion, loss of communication richness, coordination breakdown, loss of team awareness and cultural differences. To be able to overcome problems caused by these influence factors, team members should have according competences to deal with those problems. According to Holden [8], knowledge management is a crucial aspect for the success of global teamwork. Prikladnicki, Audy and Evaristo [14] point out that especially knowledge sharing is important.

Based on barriers and curricula, we have structured the competences as shown in Figure 1.

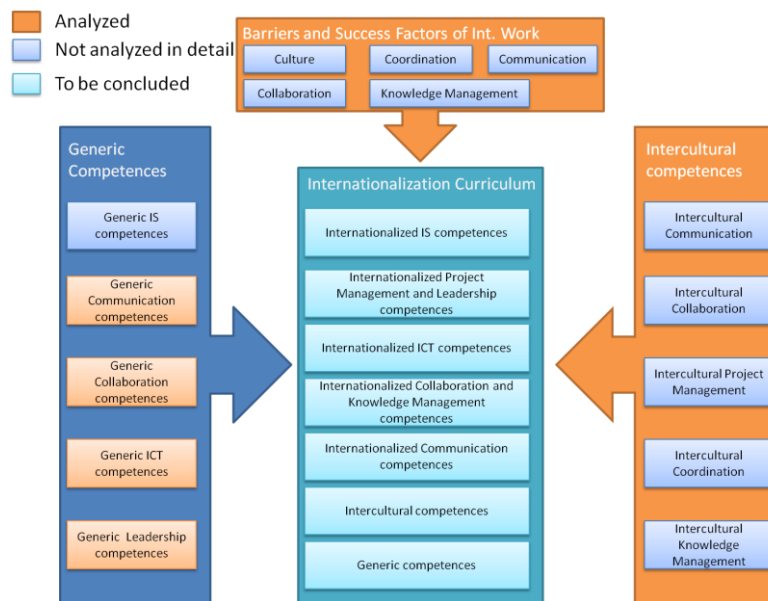


Figure 1: Framework of the international IS curriculum

The categories of this curriculum are named as internationalized competences, in the rest of the paper we will refer to these categories without this specification but assume the usage in an international setting. The figure also shows that generic competences can and will be part of the internationalized curriculum. Seven different categories were identified. These are:

- **Generic competences** which includes unchanged and generic competences from different categories but focusing mainly on domain specific competences.
- **IS competences** focusing on domain specific IS competences adapted for the international context.
- **ICT competences** ranging from basic computer skills and skills to operate different programs to more complex knowledge about IT Architectures, Security and Management.
- **Project Management and Leadership competences**, which could also be referred to as Coordination competences, covering areas such as basic business competences, team management and work distribution.
- **Collaboration and Knowledge Management competences** including knowledge sharing and transfer as well as work attitudes in an international team.
- **Communication competences** which focus strictly on the exchange of messages and information in verbal and written form including choice of communication style and management of communication.
- **Intercultural competences** including cultural awareness and understanding of cultural differences.

The role of intercultural competences has to be further analyzed as it is foreseen that intercultural competences influence competences of the other categories, meaning that for example communication styles and group work behaviors have to be adapted to be successful in an international context. Especially for the IS competences this relation is unclear at this point

and will therefore be not part of this study. We will address this problem in a later qualitative study with several domain experts to analyze which competences have to be adapted. We therefore focus on the last five categories as they are already established in different subject areas such as international business. We proposed a differentiation and will refer to these five categories as internationalization competences while we will refer to the IS competences (generic and internationalized) as domain competences.

The competences related to knowledge management in the combined category with collaboration should be seen as group knowledge management and by that focusing largely on the sharing and transfer of knowledge. Aspects of knowledge management can also be found in other competence categories such as organizational knowledge management in the category of project management and techno-centric knowledge management in the categories of ICT and IS competences.

### 3 Methodology

The study presented in this paper is part of a research strand targeted at establishing a detailed competence framework and new IS curricula. The main competence categories and competences for this framework and potential curricula are not yet established. Furthermore, we aim at taking the perspective of all involved stakeholder groups into consideration. Therefore, we conduct an explorative study. This is done both by an in depth literature review and qualitative studies with experts of the field. We expect that the analysis of these studies will provide a wide set of competences and competence categories. To filter the results for the most important competences to be included in our framework and in upcoming curricula, we will additionally use quantitative studies covering all stakeholder groups. Therefore, we apply a mixed method approach [7][9].

The main aim of the presented first study is to identify and validate competence categories and an initial set of competences for each category and to control the validity and reliability of our approach. We aim also at providing a sound methodology which can be used to explore competences for specific domains (e.g. E-Business). In the first step, we focus on generic competences and competence categories identified by an in depth literature review to analyze their suitability for an internationalized curriculum. We hereby also focus on the internationalization competences as described in chapter 2.2.

To validate the competence categories and according competences, we ask participants how important they see each of the identified items and whether they suggest additional items to be included. We rank competence categories and competences by importance to analyze which of them should be included in our framework. The results of the qualitative question regarding additional categories and competences were ranked according to the number of mentions. The additional mentioned categories and competences will be analyzed in further studies.

Besides establishing a competence framework, our target is to validate and reliability of our study. We validate our study by analyzing external validity, understandability of specific competences. According to Järvinen [10], the external validity describes to which extend conclusions would be transferable to other people in other locations at other times. The external validity was addressed in our approach by the random selection of participants from all major stakeholder groups. The study will also be applied in the future in a different setting and context to further analyze the external validity. The understandability of the questions and competences

is addressed by using a face validity approach [10]. This means we conduct qualitative interviews with chosen participants of the study of each stakeholder group to gather their feedback regarding the questions and competences. In these interviews we focus especially on the detail level of the competences. This means that we will analyze if the granularity of the competences fits the understanding of participants or if we should change to a different granularity in the competence phrasing.

To check the reliability of the study we focus on the internal consistency reliability [17]. It will be analyzed by calculating the deviation between the ratio of importance of a competence category and the average of the competences in this category.

## 4 Study

### 4.1 Study design

In our literature review, an initial set of generic competences was identified. By this analysis, we identified all together 98 different competences: 24 communication competences, 26 collaboration competences, 17 project management competences, 17 intercultural competences and 14 ICT competences. The identified competences are not atomic competences meaning that they can be split into more detailed competences. By this, the competences are better understandable. After an in depth analysis the competences could be clustered into 59 unique competences. Most of these competences are generic competences meaning that they were not internationalized at the point of the study. At the first step the target is to identify a set of possible competences for the internationalization competence categories and in the next step these competences will be enriched by international and cultural aspects. However, few competences had already the international aspect. Outgoing from these findings a first quantitative questionnaire focusing on the relevance of both the competence categories and the specific competences was designed. The categories and according competences were presented to the participants and participants to rate their importance on a five point Likert scale (1 *unimportant*, 5 *very important*). The participants also had the options to suggest additional categories and competences for each category.

To get a good overview of requirements for the internationalization of the IS curriculum a wide range of different stakeholder groups were addressed. All together 76 people were asked to participate in the study. Of these, 33 people (about 42%) answered the questionnaire completely and were used for the analysis. These 33 were in particular:

- Higher Education Teachers / Researchers in IS (20 participation requests / 16 Responses)
- Students (40 participation requests / 12 Responses)
- Professionals (Graduates/HR Managers, 16 Participation requests / 5 Responses)

The participants were chosen randomly to incorporate the different stakeholder groups. They were addressed by several stakeholder specific mailing lists such as student and faculty mailing lists, business sector mailing lists and several more. As one of the main aims of this study was the validation of the approach a small number of participants were sufficient. The results will be used to engage in a large scale quantitative and an additional qualitative study. However, the aim of this paper is not to compare the needs and requirements of the different stakeholder groups. For exploring the views of the target groups in-depth, we chose the small sample size in this study.

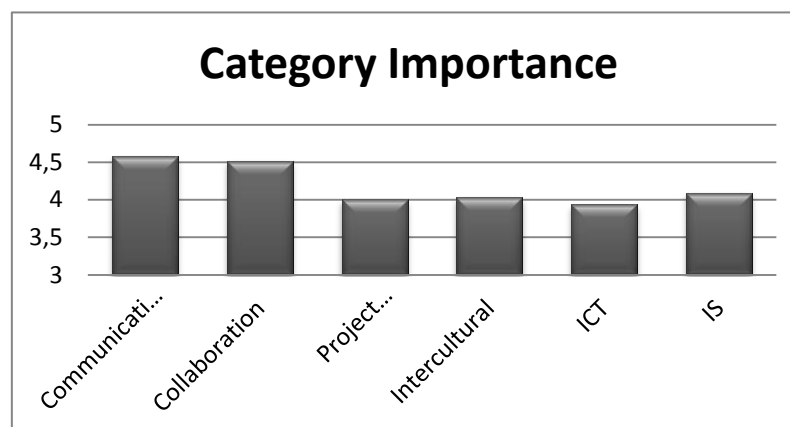
## 4.2 Findings

In this chapter, we present the first results of the study. We focus on the importance of the different categories and competences for each category.

### 4.2.1 Importance of competences

The analysis of the results showed that the competence categories communication and collaboration were seen as the most important categories. The importance of these two categories was even seen higher than the importance of the domain specific IS competences. Unlike these categories, ICT competences were seen as the least important for an internationalized IS Curriculum. A full overview of the importance of the categories is shown in Figure 2.

The intercultural competence category was seen almost as important as IS competences. But due to the fact that over 10% of all participants referred to intercultural competences (e.g. knowledge of different religions, cultural knowledge, cultural empathy etc) when asked for additional competence categories, it can be concluded that this category is quite unknown to the participants and needs more elaboration and investigation. This can be explained by the fact, that intercultural competences are not included in the analyzed model curricula.



**Figure 2: Category importance**

Additionally, economics and business competences were mentioned by the participants. These competences are integrated in the German [19] but not in the ACM model [5] curriculum.

Summarized the findings show that the identified competence categories are all seen as important but that additional categories like basic business competences should be considered for future studies. For each of the identified categories, the participants were asked to rate the importance of specific competences from our literature review. The average importance of all competences is between 3,3 (a bit above neutral) and 4,75 (a bit under very important). This shows that our literature review captured a set of important competences for each category. The most important competences for each category are shown in Table 2. The competences presented in the table are generic competences (see chapter 2.2 and 4.1 and participants were asked how important they would see these in international settings. In the forth column we present the status of the competence meaning if the competence is generic and most likely will stay generic or if it is internationalizable. However, this information was not part of the study and has to be verified with experts.



Category	Competence Description	Importance	Status
Communication	Ability to communicate sensitively taking into account other personalities and cultures	4,36	Internationalized
	Ability to listen to others and consider their thoughts	4,3	Internationalizable
	Ability to communicate clearly and articulately	4,27	Internationalizable
	Ability to focus on key points during communication	4,27	Generic
Collaboration and Knowledge Management	Ability to build national and international relationships and networks on a professional level	4,4	Internationalized
	Ability to share information and knowledge with the team	4,3	Internationalizable
	Ability to collaborative problem resolution	4,24	Internationalizable
	Ability to understand other peoples perspectives, needs and values	4,24	Internationalizable
Project Management and Leadership	Ability to manage own work	4,46	Generic
	Ability to use other peoples expertise and knowledge	4,46	Generic
	Ability to take responsibility	4,33	Internationalizable
	Ability to make decisions	4,33	Internationalizable
Culture	Foreign language skills (e.g. English)	4,76	Internationalized
	Understanding of the influences and implications culture has in work life	4,33	Internationalized
	Ability to adjust to different cultures	4,12	Internationalized
	Ability to evaluate perspectives, practices and products from multiple cultural perspectives	4,12	Internationalized
ICT	Ability to align ICT with the business requirements	4,27	Generic
	Understanding of importance and limitations of different information sources	4,09	Internationalizable
	Ability to find quality information with the help of ICT	4,06	Generic
	Ability to identify problems with ICT	4,06	Internationalizable

**Table 2: Most important competences per category**

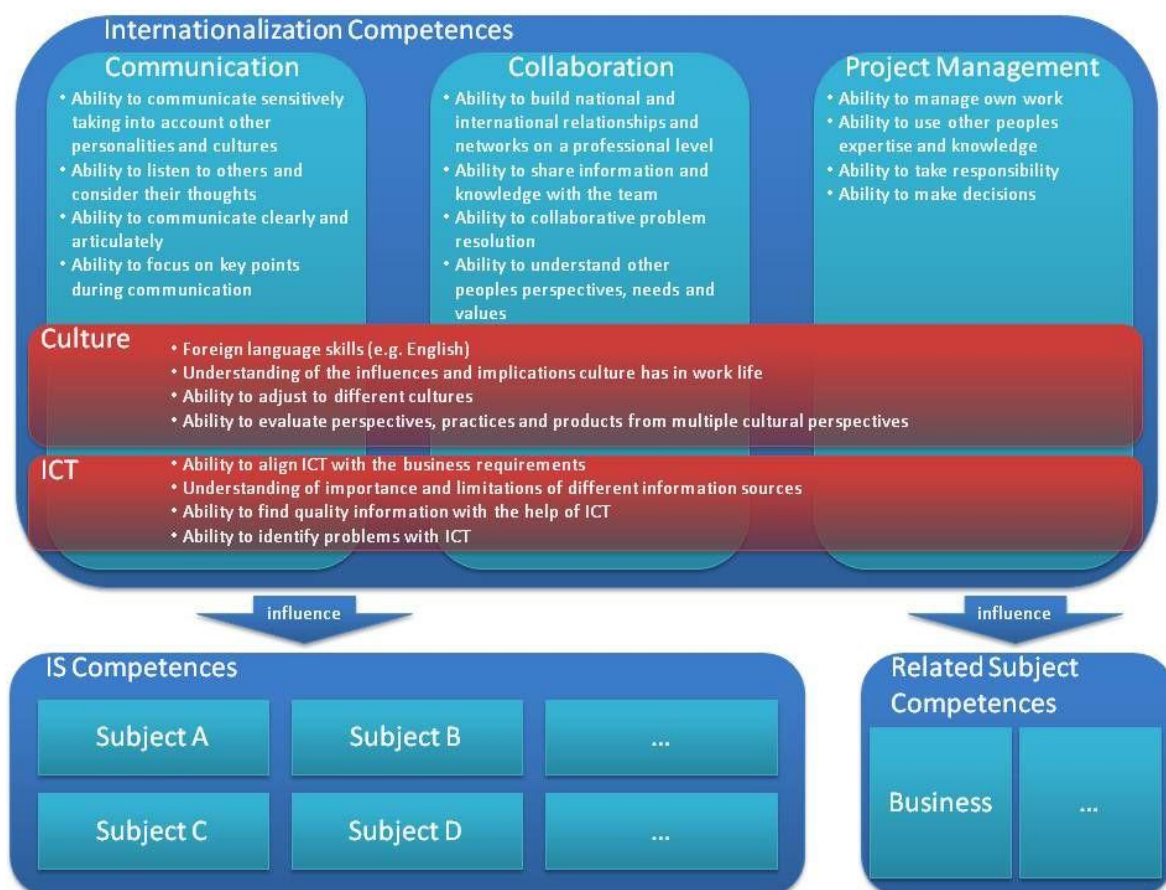
It can be seen that common language skills – in the culture category - are seen as the most important competence for a graduate of international IS studies. This finding is in line with the results of our literature review. In most sources language skills were seen as crucial for the success in an international setting. English skills can be seen as a substitute for finding a common language between all partners involved in the collaboration and team work. This might be English for most projects but could also be any other language depending on the involved nationalities. Furthermore, the qualitative questions regarding additional competence categories showed, that the participants felt that language competences should be an own category. According to these two results a language category will be considered. The ability to align ICT with the business requirements (as additional competences) is seen as the most important

ICT competence but was just mentioned in one of the sources in the literature review. In contrast to that competences like the ability to adapt the communication style to fit the audience and the ability to choose the appropriate medium for the communication, which were included in most competence frameworks, are not seen as most important from our participants.

As a summary, all competences were given an average importance of over three (neutral) and shall be included in the initial set of internationalization competences. Further studies have to be conducted to identify a clear ranking of the importance of the competences.

#### 4.2.2 Framework for the Internationalization of IS Curricula

Based on the presented results, an outline for the internationalization of the IS curriculum was identified. The outline of a first curriculum draft is shown in Figure 3. It is divided into three main fields, namely internationalization competences which may influence related subject competences and IS competences.



**Figure 3: IS internationalization curriculum**

The internationalization competences are, according to our classification (see 2.2), divided into communication, collaboration, project management, culture and ICT. Culture and ICT are displayed as horizontal boxes in the figure to visualize the impact they have to the other competence categories. A good example for this is the first competence presented in communication (Ability to communicate sensitively taking into account other personalities and cultures) which is clearly influenced by the category culture. For each internationalization competence category the four most important competences from Table 2 are shown.

The related subject competences include at the moment just business competences. These have to be clearly separated from project management competences. We understand business competences on a high level, according to the definition given by the University of Adelaide in their capability definition, as “the understanding of key business drivers for performance and use of sound business practices and the ability to use sound commercial principles in all areas of responsibility” [18]. A further differentiation and specialization will be included in upcoming studies.

Due to the high importance of language competences in the results and the mentioning of these as an additional category it can be discussed if these should be seen as an own related subject. A different option would be to include the language competences into the internationalization competences similar to culture and ICT competences. This can be favoured because the language competences will also influence the other competence categories. It can also be argued, that language competence fall into the communication category and build a foundation for further culture competences. This will be analyzed in a later stage.

The IS competences (and how they are influenced by the internationalization competences) were not included in the presented study and will be analyzed as one of the next steps. The sub domains of IS are not presented in the Framework as they were identified outgoing from existing model curricula but not verified in this study. The verification of these categories and an initial set of competences for each category will be the next step. Especially the influences of cultural differences have to be analyzed. Therefore, a qualitative approach will be taken.

The results show that the literature findings were valid. We extended those based on our study. Nevertheless, because of the limitations of this study further validations have to be carried out.

### 4.3 Validity, Reliability & Limitations

As described in chapter 3, we use the deviation of the importance for each category to the average importance of the competence of the category to analyze the internal consistency reliability. The results of this analysis can be seen in Table 3.

Category	Category Importance	Average Competence Importance	Deviation
Communication	4,58	4,03	0,55
Collaboration	4,52	4,05	0,47
Project Management	4	4,09	-0.09
Culture	4,03	4,03	0
ICT	3,94	3,95	-0.01

**Table 3: Consistency, reliability & deviations**

Table 4 shows the average importance of each category, the average importance of the competences of each category and the deviation between those two. The deviation for the categories project management, culture and ICT are zero or close to zero. This means that the importance of the category and the competences are in line. We therefore conclude that the identified competences are suitable and an initial reliability for these categories is given. Both will be analyzed in upcoming studies.

#### 4.4 Utilization of the Framework

The framework and the identified competence categories and according competences are a first step towards modernization of existing learning services. With the help of these findings we enable university to analyze their offers in terms of IS education and give a first impression how an existing should be adapted to fit the new and changed requirements of the industry. Aspects such as cultural learning, communication and project management are underrepresented in existing IS learning services and curricula but pose a big challenge in today's work life. By integrating these aspects into existing curricula a better fit to industry requirements can be achieved.

From the perspective of industry our research and results give a first impression which individual competences of employees are candidates to lead to an enhanced individual and therefore in the long run organizational performance. Organizations can use the results as a basis for the creation of specific job profiles and can therefore improve their staffing and recruitment practices and processes. They will additionally be able to better analyze the potentials of employees for specific positions within the organization and improve their organization internal employee development and knowledge management as important knowledge, competences and skills besides the domain specific competences were identified.

### 5 Conclusions & Outlook

In our literature review, we identified a classification and an initial set of internationalization competences and their importance for the IS domain. The study confirmed these findings and some additional categories and competences were proposed and can be analyzed. We also identified an initial set of highly important competences for each category. These competences are valid candidates to modernize existing learning services to achieve a better fit the requirements for companies for graduates ready to work in the international market.

According to these findings, we derived a framework for the internationalization of the IS curriculum. The framework can be utilized both from educational and industrial perspective to design and improve specific learning services as shown in chapter 4.4 This framework will be both used to structure future research and extended and adapted according to new findings.

The results and also the user feedback have shown that more investigation of specific aspects, like the ranking of the importance of the competence categories, is necessary. Therefore, we can see the results of this study as a good starting point for further studies. The positive feedback regarding the relevance of the study from all stakeholder groups shows the needs for the internationalization of the IS curriculum. In the next step, further competences will be derived and validated. Potential future research aspects include the following:

- Analyzing the internationalization of the presented competences including the questions which competences have to be adapted and which stay unchanged
- Analyzing the domain specific IS competences and the influences the internationalization has on them
- Refining competence categories for specific sub-domains / career paths (e.g., E-Business, Software Development)

- Ranking the importance of the competence categories and competences
- Comparative study for different stakeholder groups
- Qualitative analyses to identify changes to the IS competences

Our study serves therefore as a basic framework for internationalizing IS competence frameworks and curricula and as guidance for further research in this field. To address the above mentioned aspects further studies including a Delphi study with an expert group are planned and will lead to an initial proposal for an internationalized IS curriculum.

## 6 Acknowledgment

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